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**Bridge Report for the Introduction of the New Sample Design and Questionnaire for the Local  
Nonproperty Component of the Quarterly Summary of State and Local Tax Revenues**

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# **BRIDGE REPORT FOR THE INTRODUCTION OF THE NEW SAMPLE DESIGN AND QUESTIONNAIRE FOR THE LOCAL NONPROPERTY COMPONENT OF THE QUARTERLY SUMMARY OF STATE AND LOCAL TAX REVENUES**

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## **1. Background**

The Quarterly Summary of State and Local Tax Revenues (Quarterly Tax Survey) is comprised of three components: a local government property tax data collection from local property tax collectors (F71), local nonproperty tax data collection from local government tax imposers (F73), and a state government tax data collection (F72). The F71 component has historically resulted from a stratified sample that was fully imputed and estimated using a Horvitz-Thompson weighted estimator. The estimates from this sample of property tax collectors are subject to sampling error of about 1.5 percent on a national estimate of property tax. The F72 is a census of all state government tax imposers and is not subject to sampling error. The F73 component has historically resulted from a nonprobability sample. As such, sampling errors could not be calculated.

In 2007, the Committee on National Statistics recommended that the Census Bureau replace the current methodology for the Local Nonproperty Tax component with a methodologically sound and repeatable sample and estimation process. The sample for the Property Tax portion of the survey was reselected for the first quarter of 2009 using basically the same sample design as had been used historically. The frame for that sample was the 2002 Census of Governments: Finance component. A sample was selected from the jurisdictions in the 2002 Census, and all tax collectors in the jurisdiction were selected for the sample. For the Local Nonproperty Tax component, more changes were being instituted, thus calling for more extensive research. A new questionnaire was devised that asked for eleven rather than just three taxes (sales, individual income, and corporate income taxes). The expanded questionnaire was cognitively tested in a series of cognitive interview trips detailed in Research Report Series #2010-1 (Graham, 2010). The questionnaire was finalized and a sample of tax imposers was selected for use in the fourth quarter of 2010, denoted 2010Q4. Data were collected for four more quarters for release with this bridge report. Census continued releasing preliminary estimates using the historic methodology.

In this report, we compare the results of the old methodology with the results from the new methodology. Total Quantity Response Rates (TQRRs) are presented in Table 1 of this report to show the quality of the data. Accompanying (QTax Table 1, June 26, 2012), Census now provides measures of nonsampling error in Table 1a and measures of sampling error in Tables 1b and 1c. These measures continue to be monitored as Census works to improve the quality of the new sample estimates.

In Section 2 of this paper, we discuss methodology. In Section 3, we discuss the results of our bridge comparison. Finally, in Section 4, we conclude with direction for the future.

## **2. Methodology**

The sample for the F73 survey is a stratified random sample designed to give estimates of major nonproperty taxes (e.g., sales and individual income) with a coefficient of variation of three percent or

less. The survey questionnaire was also redesigned to give estimates of local government taxes for all applicable local taxes that appear in (QTax Table 1, June 26, 2012). The total sample size for the F73 component is about 3,500 governmental units. For this bridge study, Census collected data and processed the F73 component two ways: (1) the original methodology, which resulted from a nonprobability survey, and (2) the new methodology, which introduced a probability sample and a repeatable estimation methodology. Originally a three-quarter bridge study was planned. The bridge was extended because of difficulties encountered in obtaining adequate response. When the sample and new questionnaire were introduced to the survey participants, the unit response rate was very low. During the course of the F73 bridge collection, the unit response rates have remained low. However, the Total Quantity Response Rates have consistently yielded high response rates, usually in excess of 80.0 percent. After the completion of a five quarter bridge study, this analysis is being published to inform users of the differences between the original methodology and the modeled estimates from the new sample.

Evaluations of the edit, imputation, and estimation components, as well as nonresponse bias studies, are ongoing in order to continue the improvement of the F73 component. This bridge is to evaluate the revisions and allow the data user the opportunity to see the magnitude of the jump resulting from the introduction of the new methodology.

The data for this survey were edited to correct for errors in the reported data. The data were not imputed for nonresponse because the lack of responding units precluded unit imputation. Instead, a nonresponse weighting adjustment was used during the modeling. In order to compensate for the lack of response, Annual Finance Survey data and Census of Governments data from 2007, 2008, 2009, 2010, and the six quarters of collected Quarterly Tax bridge data were used in the modeling. R-squares and consistency with the annual surveys were used to determine which models to use for each tax and quarter.

Prior to the estimation, edit research was conducted to determine ratio edits and appropriate edit boundaries, but a lack of quarter over quarter historical data precluded Census from developing edit boundaries in the traditional method of determining the bounds using the Hidioglou-Berthelot methodology or resistant fences. As the survey yields more usable data, the current edits will be researched to determine the best set of boundaries to use. The data were edited prior to modeling.

In this report, property tax estimates are also shown in the tables. The columns in Table 1 that are denoted as "Previous" are the previously released estimates. Although the methodology for the imputation and estimation of property tax did not change, the estimates changed slightly due to the receipt of revised data from the respondents. Respondents may submit revised data for up to seven quarters.

**Table 1: Bridge Report for the 2012 Quarter 1 Summary of State and Local Tax Revenues**

	Property				Individual Income				Corporate Income			
	Previous	Final	TQRR	ΔF in %	Previous	Final	TQRR	ΔF in %	Previous	Final	TQRR	ΔF in %
2012Q1		114577	89.2			67016	91.6			11664	83.8	
2011Q4	177203	177959	91.3	0.4	68795	70466	94.4	2.4	9635	9979	86.0	3.6
2011Q3	87402	88929	88.3	1.7	66613	70193	88.1	5.4	9211	9636	82.3	4.6
2011Q2	88126	89117	79.7	1.1	91614	88789	92.8	-3.1	18613	18426	84.6	-1.0
2011Q1	113254	114598	78.8	1.2	64338	66064	91.8	2.7	11015	11224	84.9	1.9
2010Q4	176771	177527	83.3	0.4	66021	67530	94.4	2.3	10491	10779	86.6	2.7

	General Sales				Motor Fuel Sales				Tobacco Sales			
	Previous	Final	TQRR	ΔF in %	Previous	Final	TQRR	ΔF in %	Previous	Final	TQRR	ΔF in %
2012Q1		71071	91.4			10214	95.0			4031	89.5	
2011Q4	75225	72279	94.0	-3.9	10144	10522	99.9	3.7	4411	4450	97.8	0.9
2011Q3	73310	70884	87.5	-3.3	10247	10453	96.7	2.0	4665	4668	96.0	0.1
2011Q2	80638	78555	86.6	-2.6	10663	11855	97.3	1.8	4664	4698	91.9	0.7
2011Q1	72785	67284	94.8	-7.6	9783	10090	98.8	3.1	4038	4036	98.1	0.0
2010Q4	73051	71243	89.5	-2.5	9956	10223	99.4	2.7	4448	4476	97.5	0.6

	Alcoholic Beverage Sales				Motor Vehicle License				Other Taxes			
	Previous	Final	TQRR	ΔF in %	Previous	Final	TQRR	ΔF in %	Previous	Final	TQRR	ΔF in %
2012Q1		1672	92.5			6883	92.2			39157	88.6	
2011Q4	1582	1624	96.4	2.7	5981	6508	95.7	8.8	34211	35837	92.8	4.8
2011Q3	1449	1468	95.2	1.3	6159	6724	93.7	9.2	33028	33574	90.3	1.7
2011Q2	1641	1658	92.2	1.0	7068	7847	89.3	11.0	42124	44045	87.0	4.6
2011Q1	1473	1485	95.4	0.8	6501	6964	91.4	7.1	37730	38880	91.7	3.0
2010Q4	1550	1590	93.5	2.6	5696	5757	96.5	1.1	31057	31561	92.2	1.6

	Total Taxes		
	Previous	Final	ΔF in %
2012Q1		325,285	
2011Q4	387,187	389,625	0.6
2011Q3	292,084	296,528	1.5
2011Q2	345,151	343,990	-0.3
2011Q1	320,917	320,626	-0.1
2010Q4	379,041	380,688	0.4

Explanation of columns:

Previous = Numbers we published last quarter

Final = Numbers we are releasing this quarter

TQRR = Weighted estimate from the respondents / the final estimate

ΔF in % = (Final - Previous)/Previous expressed as a percent

Source: U.S. Census Bureau, 2012 Quarterly Summary of State and Local Tax Revenues. Data users who

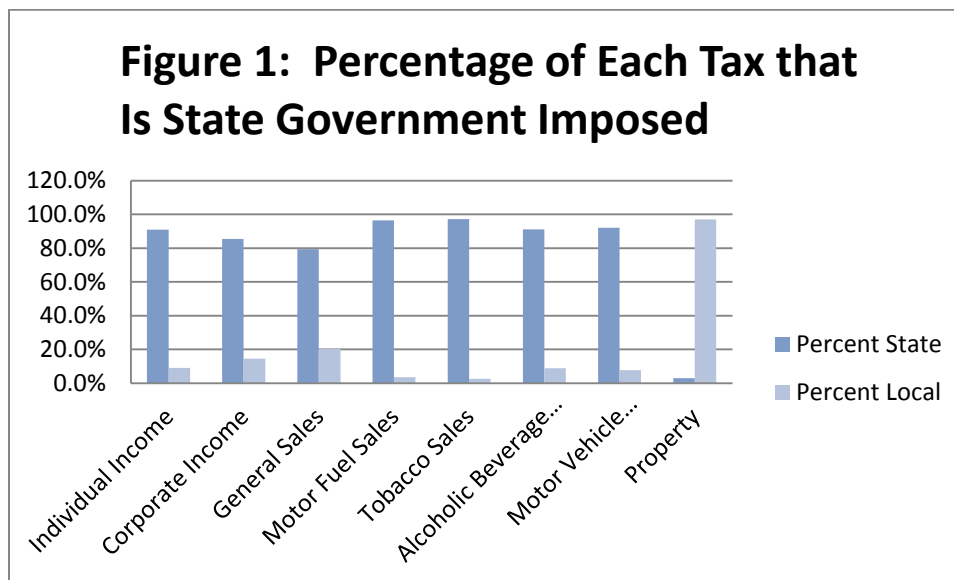
create their own estimates using data from this report should cite the U.S. Census Bureau as the source of the

original data only. The data in this table are subject to sampling variability. Additional information on sampling

and nonsampling error may be found at with the full data tables on [www.census.gov/govs](http://www.census.gov/govs).

### 3. Results

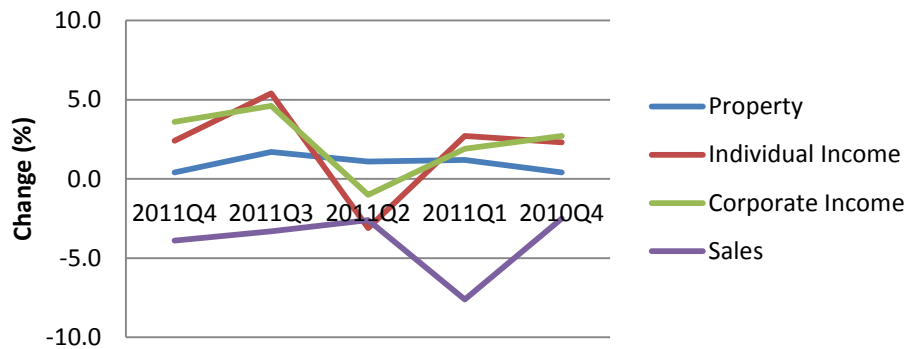
Table 1 gives the results for the five quarters of the bridge study plus the final estimate for 2012Q1. This estimate is the official estimate for the first quarter of 2012 as the previous methodology has now been discontinued. Although the Unit Response Rate continues to be low for the F73, the state and local government totals that are presented in (QTax Table 1, June 26, 2012) have TQRRs that are all above the Census Bureau's standard of 70.0 percent. This is largely because the state government, which usually responds, generally comprises 80.0 percent or more of the state and local total for most nonproperty taxes. The opposite is true for state and local property tax totals. This is illustrated in Figure 1 using data from the 2009 Annual Summary of State and Local Government Finances.



Generally, the revisions resulting from the new methodology are not large. As can be seen in Figure 2 for the major state and local government taxes, the differences between the revised state and local estimates and the original estimates are between -7.6 and 11.0 percent. Figures 2 and 3 show that the revisions using the new methodology are usually positive, except for general sales tax which has been over-estimated historically. As can be seen in Figure 3, motor vehicle license estimates have experienced the largest revisions, but other selected taxes have generally been revised between 0.0 and 4.0 percent.

As the response rates increase, these results can change. The models will more than likely rely more on the collected Quarterly Tax data and less on annual and census year data. An analysis of revisions will continue to be released as the data improve over time.

**Figure 2: Revisions Resulting from Methodology Changes for Major Taxes**



**Figure 3: Revisions Resulting from Methodology Changes for Selected Taxes**

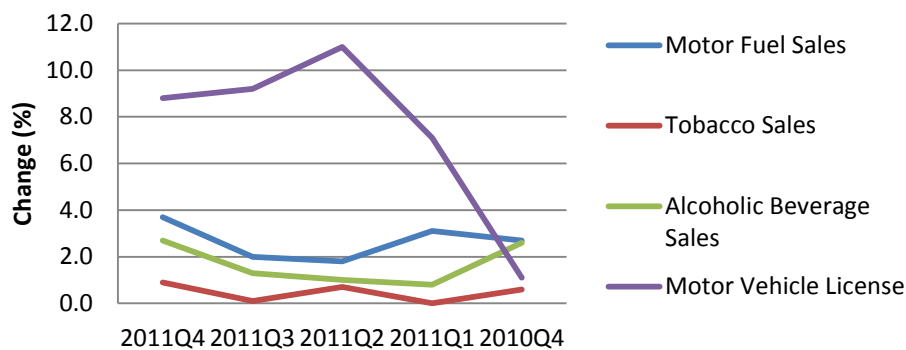
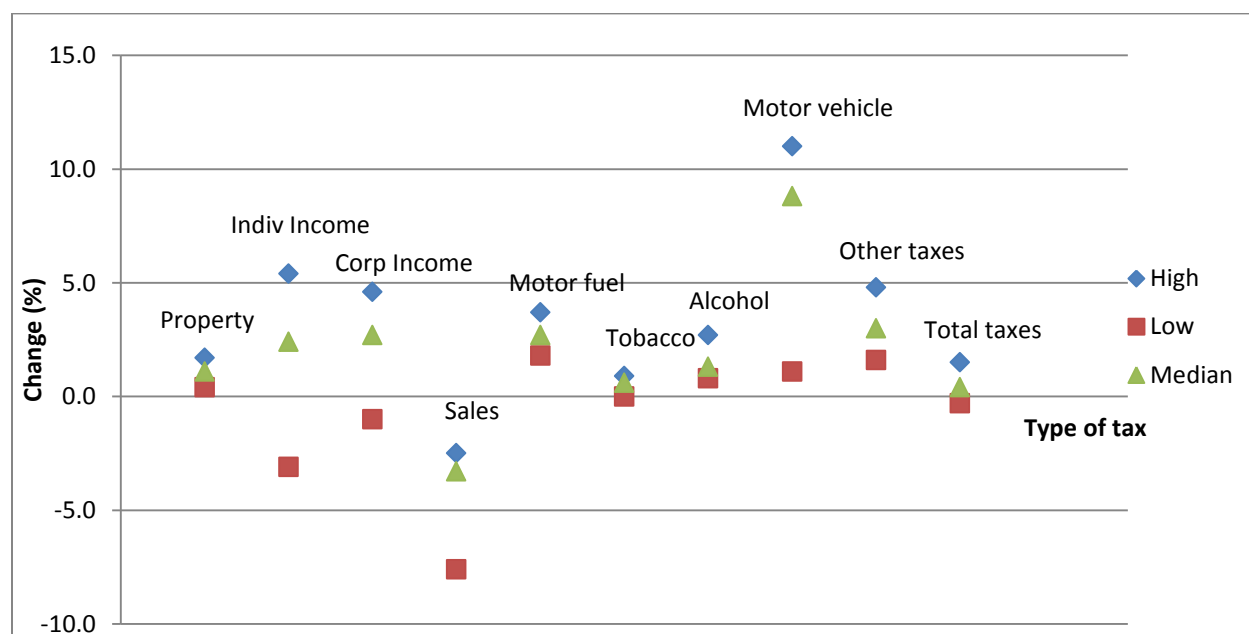


Table 2 summarizes the absolute changes from the original to the revised numbers using the new methodology. For each quarter, the largest and smallest absolute differences are given along with the mean and median of the absolute differences. For the three most recent quarters of the bridge study, Motor Vehicle Licenses displayed the largest absolute differences between the old and new methodologies. Property and tobacco sales tax consistently displayed the smallest absolute revisions. This is explainable for property tax because the methodology was not changed. A new sample was selected from an updated frame. As explained earlier, only respondent revisions are captured for property tax revisions. It should be noted that the mean absolute difference between the two methodologies consistently ranges between 1.8 and 3.5 percent. Finally, Figure 4 shows the median and range for each of the taxes.

**Table 2: Summary of Absolute Adjustments by Quarter**

	<b>LARGEST ABSOLUTE CHANGE</b>	<b>SMALLEST ABSOLUTE CHANGE</b>	<b>MEDIAN ABSOLUTE CHANGE</b>	<b>MEAN ABSOLUTE CHANGE</b>
<b>2011Q4</b>	MOTOR VEHICLE LICENSE 10.4% UP	PROPERTY 0.4% UP	3.6%	3.5%
<b>2011Q3</b>	MOTOR VEHICLE LICENSE 9.2% UP	TOBACCO 0.1% UP	2.0%	3.3%
<b>2011Q2</b>	MOTOR VEHICLE LICENSE 11.0% UP	TOBACCO 0.7% UP	1.8%	3.0%
<b>2011Q1</b>	GENERAL SALES 7.6% DOWN	TOBACCO 0.0%	2.7%	3.0%
<b>2010Q4</b>	MOTOR FUEL & CORP INC 2.7% UP	PROPERTY 0.4% UP	2.3%	1.8%

**Figure 4: Range of Revisions for Each Tax**



## 4. Future Direction

As we continue to improve the Quarterly Tax Survey, efforts will be taken to reduce the burden on the analysts as well as the burden on the respondents. There are several options that will be considered for reducing burden and increasing the quality of the survey estimates. These range from sample reductions, to collections from a different sampling frame, to reductions in the amount of data collected. These measures will be evaluated this summer and fall with cognitive testing in New England, parts of the South, and the Washington, DC local area. Hopefully, a fully functioning alternative to the



current survey methodology will be ready for the first quarter of 2013. During this time, reports similar to this one will continue to be released to inform data users of the progress made on our continuous improvement process and the size of the revisions.

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